

three; second longer and wider than the third; wrist about twice as long as the hand, which is oblong, setose on both margins, palm transverse. The last three pairs of *peraeopods* have the first joints broadly ovate, the hind margins deeply serrate as in *Podoprion*, Chevreux, and *Podoprionella*, Sars. *Uropods*: first and second subequal in extent and scarcely exceeding the third pair; *the outer ramus in this pair has two subequal joints* and is but little longer than the inner. The telson could not be made out.

The single specimen was not dissected; the mouth-parts therefore could not be described.

LXII.—*Notes on British Copepoda: Change of Names.*

By THOMAS SCOTT, LL.D., F.L.S.

[Plate XI.]

Genus PHYLLOPODOPSYLLUS *, T. Scott, nov.

Syn. *Tetragoniceps*, T. Scott, in part. (not *Tetragoniceps*, G. S. Brady).

Description.—Resembling *Tetragoniceps*, G. S. Brady, in form. Anterior antennæ about as long as the cephalothoracic segment and composed of nine joints, the second joint bearing a more or less prominent hook-like spine, and the fourth a tolerably elongated sensory filament. Posterior antennæ three-jointed; outer ramus small, unarticulate. Mandibles small, biting-edge truncate and armed with several small teeth; palp tolerably large, basal joint with two, apparently unarticulate, branches, the distal branch being the longer. First maxillipeds five-jointed; first joint large and furnished with a few marginal processes, other joints small. Inner branches of the first four pairs of thoracic legs two-jointed, and the outer three-jointed. In the first pair the inner branch is elongated, and the first joint longer than the entire outer branch, the second joint is short. In the other three pairs the outer branch is elongated, while the inner is very short. The fifth pair are each composed of a large leaf-like plate, and they together completely enclose the ovisac; each plate is provided with a few setæ on the outer and distal margins. The abdomen consists of five segments and has the middle one produced distally on the underside into a

* φύλλον, a leaf; πούς, a foot; ψάλλος, a flea: from the leaf-like fifth pair of feet.

distinct tooth-like process. Furcal joints moderately short, inner margin lobate near the base.

No males observed.

Type species *Phyllopodopsyllus Bradyi*, T. Scott. Described in 1892 under the name of "*Tetragoniceps Bradyi*, T. Scott," in the 'Tenth Annual Report of the Fishery Board for Scotland,' pt. iii. p. 253, pl. ix. figs. 19-32.

Remarks.—This species, which appears to be scarce, but with a fairly wide distribution, has a close resemblance to *Tetragoniceps*, G. S. Brady. The anterior antennæ, however, are composed of nine joints and it is the second (not the first) joint that is strongly toothed. There is a difference in the structure of the maxillæ and first maxillipeds, but the most obvious difference is in the structure of the fifth pair of thoracic feet, which are so large and leaf-like that they enclose the entire ovisac. The species is described and figured in the Fishery Board Report referred to above.

Genus *PTEROPSYLLUS**, T. Scott, nov. (Pl. XI. figs. 7, 8.)

Syn. *Tetragoniceps*, T. Scott, in part. (not *Tetragoniceps*, G. S. Brady).

Description.—This genus resembles in some respects the one last described, as well as *Tetragoniceps*, G. S. Brady, and seems to hold a somewhat intermediate position between them. The anterior antennæ are composed of eight joints; the first is elongated, the second is shorter and has the upper distal angle produced forwards into a tooth-like process, and the fourth is provided with a sensory filament. Posterior antennæ apparently three-jointed; outer ramus rudimentary, consisting of a minute uniaarticulate joint. Mandible and palp as in *Tetragoniceps*. The maxillæ and maxillipeds are also somewhat similar to those of the same genus. Both branches of the first pair of thoracic feet three-jointed; the first joint of the inner branch is as long as the entire length of the outer branch, but the second and third joints are small. The next three pairs have the inner branches two-jointed as in *Phyllopodopsyllus*. In the fifth pair the basal joint is small, but the secondary joint is large and foliaceous—large enough to enclose the ovisac. Abdomen composed of four segments. Furcal joints tolerably elongated.

No male observed.

Type species *Pteropsyllus consimilis*, T. Scott. Described in 1894 under the name of "(?) *Tetragoniceps consimilis*," in

* πτερὸν, a wing; ψύλλος, a flea: the fifth pair of thoracic legs being wing-like.

the 'Twelfth Annual Report of the Fishery Board for Scotland,' pt. iii. p. 244, pl. vii. figs. 4-12.

Remarks.—*Pteropsyllus consimilis* differs from the more typical forms of *Tetragoniceps* in the structure of the anterior antennæ and more particularly in that of the first and fifth pairs of thoracic feet, and these differences are so obvious that the species ought, I think, to be removed from the genus to which it was at first doubtfully ascribed. The species appears to be moderately rare. I have no record of its occurrence from any place outside the Forth Estuary.

Genus EVANSIA, T. Scott, nov.

In 1892 I described under the name of *Tetragoniceps incertus* a Copepod which, a short time before, had been observed in the Forth Estuary. In its general form the species was very like *Tetragoniceps*, but it differed so greatly in the structure of some of its appendages that its place in that genus could only be regarded as temporary.

Further research has shown that the species has a tolerably wide distribution, and the examination of additional specimens proves that its position in *Tetragoniceps* is untenable. I therefore propose to remove it to a new genus—*Evansia*, which is named in compliment to Mr. William Evans, F.R.S.E., Edinburgh, whose successful researches in various branches of natural history have added greatly to our knowledge of the fauna of Scotland.

The following is a description of the more important characters by which the genus may be distinguished.

Female.—Body narrow and elongated. Antennules (anterior antennæ) seven- or eight-jointed and about as long as the cephalothoracic segment. Posterior antennæ three-jointed; outer ramus small or nearly obsolete. Mandibles small, basal part usually dilated, distal part narrow, and with the truncated apex obscurely toothed; palp elongated and slender, composed of a single biarticulate branch. Other mouth-organs nearly as in *Tetragoniceps*. First pair of thoracic legs nearly as in *Tetragoniceps*. In the next three pairs the outer branches are three-jointed, slender and elongated as in those of the genus named, but the inner branches are very small and consist of only one joint. Fifth pair small, uniaarticulate, and narrowly triangular in form, and terminate in a stout apical spine. Abdomen composed of four segments.

Male.—The male is similar to the female, except, 1st, that the antennules are modified and hinged for grasping; 2nd, that the second pair of thoracic feet are provided with an

additional terminal seta on the outer branch; 3rd, the inner branch of the third pair is provided with an elongated slender spine, which springs from the base of the branch and extends to beyond the apex; 4th, the abdomen is five-jointed; and, 5th, the smaller size of the fifth pair of feet. The female carries only one ovisac.

Though *Evansia* has a close resemblance to *Tetragoniceps*, it is at once distinguished by the small uniaarticulate inner branches of the second, third, and fourth thoracic feet.

Type species *Evansia incerta*, T. Scott. Described under the name of "*Tetragoniceps incertus*, T. Scott," in the 'Tenth Annual Report of the Fishery Board for Scotland,' pt. iii. p. 254, pl. xii. figs. 1-17 (1892).

A second species was described under the name of "*Tetragoniceps pygmaeus*, T. Scott," in the 'Twenty-first Annual Report of the Fishery Board for Scotland,' pt. iii. pl. iv. figs. 11-19 (1903). This species, as pointed out in the description, agrees with *E. incerta* in all its more important characters, as, for example, in the structure of the thoracic legs in the female, and only shows some minor differences sufficient for the separation of the two species. This species will now be known as *Evansia pygmaea*, T. Scott.

Genus LEPTASTACUS, T. Scott, nov.

Description.—Body elongated, slender. Anterior antennæ in the female eight-jointed and wanting the hook-like spine observed in the same appendages in *Tetragoniceps* and *Evansia*. Posterior antennæ three-jointed; outer ramus rudimentary. Mandible and mandible-palp as in *Evansia*. First maxillipeds small, provided with two bilobed setiferous processes and a moderately stout terminal spine. Second maxillipeds slender and armed with an elongated and slender terminal claw. Inner branches of all four pairs of thoracic legs two-jointed and the outer three-jointed. In the first pair the inner branches are considerably longer than the outer, and the two joints are of nearly equal length. In the next three pairs the inner branches, which, like those of the first pair, are composed of two nearly equal joints, are much shorter than the outer. Fifth pair very small and uniaarticulate, they have each a narrow triangular outline and taper gradually to the pointed apex. The abdomen is composed of four segments. One ovisac containing a few tolerably large ova.

The male does not differ greatly from the female, but the anterior antennæ are nine-jointed and modified for grasping.

Type species *Leptastacus macronyx*, T. Scott. Described under the name of "*Tetragoniceps macronyx*" in the 'Tenth Annual Report of the Fishery Board for Scotland,' pt. iii. p. 253, pl. x. figs. 19-23 (1892). *Leptastacus macronyx* was provisionally ascribed to the genus *Tetragoniceps*, G. S. Brady, because of its slender form and because in some structural details it had a resemblance to that genus. The occurrence of specimens from other localities has enabled me to study more carefully the peculiarities of this form, and I now think that though it is closely allied to *Tetragoniceps*, G. S. Brady, its position in that genus can scarcely be maintained. The structure of the anterior antennæ, the rudimentary character of the outer ramus of the posterior antennæ, the structure of the mandible-palp, of the first maxillipeds, and of the fifth pair of thoracic feet all differ more or less from the typical *Tetragoniceps*.

This species seems to have a fairly wide distribution, as I have observed it in the estuary both of the Forth and Clyde.

Genus D'ARCYTHOMPSONIA, T. Scott, nov.

Animal closely resembling *Cylindropsyllus*, G. S. Brady, in its general form. Body elongated, narrow, cylindrical, with no distinct separation between the thorax and abdomen.

Anterior antennæ in the female short, eight-jointed, the four proximal joints being tolerably robust, while the last four are distinctly more slender than the others. Posterior antennæ three-jointed; outer ramus uniaarticulated and rudimentary. Mandibles small, narrow towards the distal end, armed with a few blunt-pointed apical teeth; the mandible-palp small and uniaarticulate. Maxillæ broadly lamelliform and with the truncated apex furnished with several tooth-like spines; palp small and two-jointed. Second maxillipeds robust, two-jointed, and terminating in a strong bifid claw. The first four pairs of thoracic legs have the outer branches three- and the inner two-jointed. In the first pair the inner branches are nearly as long as the outer and the joints are subequal in length, but in the other three pairs the inner branches are considerably shorter than the outer branches. The fifth pair are very small, one-jointed, and lamelliform. The abdomen is composed of five segments.

The male is similar to the female in its general form, but the anterior antennæ appear to be only six-jointed, the structure of the last four joints being considerably modified. The second pair of thoracic legs differ from those of the female in the presence of a tolerably long, stout, spine-like

appendage, which takes the place of one of the two long, plumose, terminal setæ (see Pl. XI. fig. 4), but otherwise the second pair closely resemble the second pair in the female. The fifth pair are smaller than those of the female, but do not appear to differ much otherwise. The abdomen consists of five segments, as in the female, the first being furnished with a pair of minute rudimentary appendages. The operculum on the median dorsal aspect of the last abdominal segment and the furcal joints differ distinctly from the same parts in the female, as shown by the drawings (figs. 5, ♀, and 6, ♂). I have not yet ascertained if one or two ovisacs are carried by the female.

Type species *D'Arcythompsonia fairliensis*, T. Scott.
(Pl. XI. figs. 1-6.)

1899. *Cylindropsyllus fairliensis*, T. Scott, Seventeenth Annual Report of the Fishery Board for Scotland, pt. iii. p. 258, pl. x. figs. 11-14, pl. xi. figs. 1-4.

This Copepod, as already stated, is somewhat similar in its form and structure to *Cylindropsyllus*, G. S. Brady, and for that reason and because no males had been yet observed it was provisionally ascribed to that genus, even though one or two structural peculiarities were noticed and referred to at the end of the specific description.

The specimens from which the species was described were collected in pools of brackish water near Fairlie, Firth of Clyde. No others appear to have been discovered till quite recently, when two males and a few females were obtained in a small sample of dredged material collected in Lerwick Harbour, Shetland. An examination of these male specimens has enabled me to confirm the opinion I had previously arrived at from an examination of the females, viz., that the differences then observed might "yet render it necessary to remove this Copepod to another genus."

These males are found to differ from those of the two species of *Cylindropsyllus* already described in the entire absence of the peculiar terminal appendages with which the outer branches of the second pair of thoracic legs are furnished, and which appear to be characteristic of the males of that genus. These male specimens from Lerwick also want the appendages which characterize the inner branches of the third pair in the males of the same genus. In the species under consideration the third pair in the male is practically similar to that of the female.

The occurrence of these differences in the male, together

with those previously noticed in the female, render the removal of this species from the genus *Cylindropsyllus* necessary, and the new genus I propose for its reception is named *D'Arcythompsonia* in compliment to Professor D'Arcy Wentworth Thompson, C.B., of University College, Dundee.

Genus HARRIETELLA *, T. Scott, nov.
(Pl. XI. figs. 9, 10.)

An apparently new species of Copepod is described in part iii. of the 'Twelfth Annual Report of the Fishery Board for Scotland.' This Copepod was provisionally ascribed to the genus *Laophonte*, Philippi, with which it partly agrees. It was mentioned, however, in some general remarks on the species that there were certain important differences that could hardly be reconciled with the definition of that genus; but as only one or two specimens had been obtained, I preferred to leave it in that genus till additional examples should be procured. The first specimens were obtained within the valves of a dead Lamellibranch (*Cyprina*) shell dredged in the Firth of Forth, but others were afterwards found in considerable numbers in the Firth of Clyde in the crevices of partly decayed wood brought up in the trawl-net, and it is in pieces of submerged and partly decayed wood I now most frequently find the species. An examination of these additional specimens showed that the differences referred to were not accidental, but characteristic of the species, and that the species could not be retained in the genus *Laophonte*. I now therefore propose to remove it from that genus to the one described below.

Description of the genus Harrietella.—Female. Body tolerably robust, cephalothorax depressed, greatest width fully half the entire length of the animal; abdomen narrow. Anterior antennæ short, six-jointed. Posterior antennæ short, two-jointed; outer ramus small and unarticulate. Mandibles small and narrow, apex truncated and provided with a few small teeth. The other mouth-organs similar to those in *Laophonte*. The first three pairs of thoracic legs, which are tolerably robust, have the inner branches two- and the outer three-jointed. In the first pair the inner branch is elongated, the first joint being considerably longer than the entire outer branch; the second is short and armed with a stout terminal claw, as in *Laophonte*. In the second and third pairs the

* This genus is named in compliment to Miss Harriet Richardson, author of 'A Monograph on the Isopods of North America.'

inner branch is very short, but the outer is of moderate length. The fourth pair differs from the others in having the outer branch, which is short and stout, composed of only two joints, while the inner consists of a small uniaarticulate and somewhat rudimentary joint. Fifth pair small, primary joint very short and broad; secondary joint triangular in form, very narrow at the proximal end, but becoming gradually wider towards the distal extremity. Female with two ovisacs.

Male unknown.

Type species *Harrietella simulans*, T. Scott. Described in 1894 as “(?) *Laophonte simulans*” in the ‘Twelfth Report of the Fishery Board for Scotland,’ part iii. p. 243, pl. vii. figs. 24-32, pl. viii. fig. 1.

Habitat.—In crevices of submerged and partly decayed wood; frequent.

Remarks.—This Copepod, though closely allied to *Laophonte*, Philippi, may be easily distinguished by its peculiar form, by the structure of the fourth pair of thoracic legs, and by the female bearing two ovisacs, instead of one as in *Laophonte*.

Genus PSEUDODIOSACCUS, T. Scott, nov.

Body tolerably robust and somewhat similar in form to *Diosaccus*, Boeck. Anterior antennæ composed of eight joints; posterior antennæ two-jointed, the outer ramus being also composed of two joints. Mandibles stout, with the biting-edge strongly but irregularly denticulated; mandible-palp similar to the same appendage in *Diosaccus*, having the basal part furnished with a single uniaarticulate branch. Maxillæ compact in structure, the masticatory lobe broad and with the obliquely truncated apex provided with tolerably long spine-like teeth. The other mouth-organs and the first three pairs of thoracic legs similar to those of *Diosaccus*. In the fourth pair the inner branch, which is considerably shorter than the outer, is slender and composed of only two joints. The fifth pair are normal in structure.

Female with two ovisacs as in *Diosaccus*.

Type species *Pseudodiosaccus propinquus*, T. Scott.

1893. *Diosaccus propinquus*, T. Scott, Ann. & Mag. Nat. Hist. ser. 6, vol. xii. p. 237, pl. xi. figs. 1-6.

This species, which was described from specimens dredged in the Moray Firth at a depth of 130 fathoms, certainly belongs to the family Diosaccidæ. Its structure exhibits a

relationship somewhere between *Diosaccus*, Boeck, and *Amphiascus*, G. O. Sars, but it appears to be more nearly allied to the first; it differs, however, generically I think from both. The outer ramus of the posterior antennæ is two-jointed. The mandibles have the biting-edge armed with distinct though somewhat irregular teeth. The maxillæ differ from the same appendages in *Diosaccus* in being compact in structure (in this respect they more nearly resemble those of *Amphiascus*), and the inner branch of the fourth pair of thoracic legs is composed of only two joints.

The species appears to be rare.

EXPLANATION OF PLATE XI.

D'Arcythompsonia fairliensis, T. Scott.

- Fig.* 1. Female, seen from the side.
Fig. 2. Male, seen from the side.
Fig. 3. Mandible and mandible-palp.
Fig. 4. Foot of second pair, male.
Fig. 5. Last abdominal segment and furcal joints, female, dorsal view.
Fig. 6. Last abdominal segment and furcal joints, male, dorsal view.

Pteropsyllus consimilis, T. Scott.

- Fig.* 7. Foot of first pair.
Fig. 8. Foot of fifth pair, female.

Harrietella simulans, T. Scott.

- Fig.* 9. Female, dorsal view.
Fig. 10. Foot of fourth pair, female.

LXIII.—*The Morphology of the Madreporaria*.—VII. *Intrapolypal Tentacles* *. By J. E. DUERDEN, Ph.D., A.R.C.S. (Lond.), Professor of Zoology, Rhodes University College, Grahamstown, Cape Colony.

CORAL polyps present remarkably few structural departures from the ordinary Zoantharian type of polyp. Their few characteristic organs are simple, and scarcely any variations

* The first two parts of this series of papers appeared in the 'Johns Hopkins University Circulars,' vol. xxi. nos. 155 & 157, and were reprinted in the *Ann. & Mag. Nat. Hist.* ser. 7, vols. ix. & x., May and August 1902; the third and fourth parts appeared in the *Ann. & Mag. Nat. Hist.* vol. x., November 1902, and vol. xi., February 1903; the fifth and sixth parts in the 'Biological Bulletin,' vol. vii., July 1904, and vol. ix., June 1905. The work is being carried out with the assistance of an appropriation from the Carnegie Institution, Washington.